

WHAT IS CLAIMED:

1. A method of designing an ion channel blocker for an ion channel comprising:
providing an ion channel having an external vestibule portion
and
providing an antibody, binding portion, probe, or ligand specific to the external vestibule portion of the ion channel, wherein the antibody, binding portion, probe, or ligand is effective to inhibit ion transport through the ion channel.

2. The method according to claim 1, wherein the ion channel is a potassium channel, a sodium channel, a calcium channel, or a chloride channel.

3. The method according to claim 1, wherein the ion channel blocker is an antibody.

4. The method according to claim 3, wherein the ion channel is contained in a mammalian cell.

5. The method according to claim 3, wherein the ion channel is from an excitable cell.

6. The method according to claim 5, wherein the ion channel is a Kv ion channel.

7. The method according to claim 6, wherein the antibody is a polyclonal antibody.

8. The method according to claim 7, wherein the ion channel is a Kv1.2, Kv1.3, or Kv3.1 ion channel.

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- ⑨. The method according to claim 8, wherein the external vestibule portion has a sequence corresponding to SEQ. ID. NO. 1, SEQ. ID. NO. 3, or SEQ. ID. NO. 4.

5 10. A method of inhibiting ion transport through an ion channel having an external vestibule portion comprising:

 providing an ion channel blocker which is specific to the external vestibule portion of the ion channel under conditions effective to inhibit ion transport through the ion channel.

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 11. The method according to claim 10, wherein the ion channel blocker is an antibody, a binding portion, a probe, or a ligand.

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 12. The method according to claim 10, wherein the ion channel is a potassium channel, a sodium channel, a calcium channel or a chloride channel.

 13. The method according to claim 11, wherein the ion channel is contained in a mammalian cell.

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 14. The method according to claim 13, wherein the ion channel is from an excitable cell.

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 15. The method according to claim 12, wherein the ion channel is is a Kv ion channel.

 16. The method according to claim 15, wherein the antibody is a polyclonal antibody.

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 17. The method according to claim 16, wherein the ion channel is a Kv1.2, Kv1.3, or Kv3.1 ion channel.

18. The method according to claim 17, wherein the external vestibule portion has a sequence corresponding to SEQ. ID. NO. 1, SEQ. ID. NO. 3, or SEQ. ID. NO. 4.

19. A method of screening a drug for effectiveness as an ion channel blocker for an ion channel, wherein the ion channel has an external vestibule portion, said method comprising:

contacting a cell having an ion channel with an ion channel blocker candidate and

evaluating the cell to determine if the ion channel blocker candidate binds to the external vestibule portion of the ion channel and inhibits ion transport through the ion channel.

20. The method according to claim 19, wherein the ion channel blocker is an antibody, binding portion, probe, or ligand.

21. The method according to claim 20, wherein the ion channel is a potassium channel, a sodium channel, a calcium channel, or a chloride channel.

22. The method according to claim 21, wherein the ion channel is a mammalian ion channel.

23. The method according to claim 22, wherein the cell is an excitable cell.

24. The method according to claim 21, wherein the ion channel is a Kv ion channel.

25. The method according to claim 24, wherein the antibody is a polyclonal antibody.

26. The method according to claim 25, wherein the ion channel is a Kv1.2, a Kv1.3, or a Kv3.1 ion channel.

27. The method according to claim 26, wherein the external vestibule portion has a sequence corresponding to SEQ. ID. NO. 1, SEQ. ID. NO. 3, or SEQ. ID. NO. 4.

28. An antibody, binding portion, probe, or ligand which inhibits ion transport of an ion channel by binding to an external vestibule portion of the ion channel.

29. The antibody, binding portion, probe, or ligand according to claim 28, wherein the ion channel is a potassium channel, a sodium channel, a calcium channel, or a chloride channel.

30. The antibody, binding portion, probe, or ligand according to claim 29, wherein the ion channel is a mammalian ion channel.

31. The antibody, binding portion, probe, or ligand according to claim 30, wherein the ion channel is from an excitable cell.

32. The antibody, binding portion, probe, or ligand according to claim 29, wherein the ion channel is a Kv ion channel.

33. The antibody, binding portion, probe, or ligand according to claim 32, wherein the antibody is a polyclonal antibody.

34. The antibody, binding portion, probe, or ligand according to claim 33, wherein the ion channel is a Kv1.2, Kv1.3, or Kv3.1 ion channel.

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